

(19) World Intellectual Property  
Organization  
International Bureau



(43) International Publication Date  
13 January 2005 (13.01.2005)

PCT

(10) International Publication Number  
**WO 2005/003081 A3**

(51) International Patent Classification<sup>7</sup>: **C07D 271/10**,  
235/10, C08G 75/20

(21) International Application Number:  
PCT/US2004/020705

(22) International Filing Date: 25 June 2004 (25.06.2004)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:  
60/482,925 27 June 2003 (27.06.2003) US

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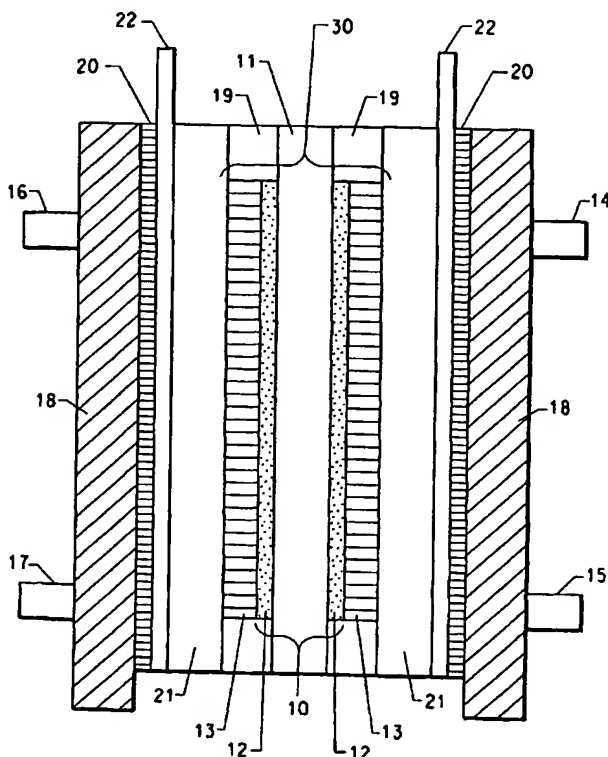
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(81) Designated States (unless otherwise indicated, for every  
kind of national protection available): AE, AG, AL, AM,  
AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN,  
CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI,  
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KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD,  
MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG,  
PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM,  
TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM,  
ZW.

(84) Designated States (unless otherwise indicated, for every  
kind of regional protection available): ARIPO (BW, GH,  
GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM,  
ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM),  
European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI,

[Continued on next page]

(54) Title: **SULFONIMIDE CONTAINING COMPOUNDS AND THEIR USE IN POLYMER ELECTROLYTE MEMBRANES  
FOR ELECTROCHEMICAL CELLS**



(57) Abstract: A compound having the general structure (I), wherein  $A_{L1}$  is a monovalent, divalent, or trivalent aromatic heterocyclic group comprising heterocyclic rings;  $R_{L1}$ ,  $R_{L2}$ , and  $R_{L3}$  are divalent fluorinated groups; m, n, and p are 0 to 3, with the proviso that m + n + p is equal to 1, 2, or 3 so that the carbon atoms of the heterocyclic rings are fully substituted by acidic fluorinated sulfonyl-containing groups; q is 0 or 1;  $Y_{L1}$  is -OH, -NH-SO<sub>2</sub>-R<sub>L4</sub>, wherein  $R_{L4}$  is a monovalent fluorinated group, -NH-, -NH-SO<sub>2</sub>-R<sub>L5</sub>-SO<sub>2</sub>-R<sub>L6</sub>, or -NH-SO<sub>2</sub>-R<sub>L6</sub>-A<sub>L2</sub>-R<sub>L7</sub>-SO<sub>2</sub>-R<sub>L8</sub>, wherein  $A_{L2}$  is a divalent heterocyclic group and  $R_{L5}$ ,  $R_{L6}$ , and  $R_{L7}$  are divalent fluorinated groups; and  $Y_{L2}$  and  $Y_{L3}$  are -OH or -NH-SO<sub>2</sub>-R<sub>L4</sub>; with the proviso that when m and n are each equal to 1, p is 0 to 1, and q is 0,  $Y_{L1}$  is selected from the group consisting of -NH-, -NH-SO<sub>2</sub>-R<sub>L5</sub>-SO<sub>2</sub>-R<sub>L6</sub>, and -NH-SO<sub>2</sub>-R<sub>L6</sub>-A<sub>L2</sub>-R<sub>L7</sub>-SO<sub>2</sub>-R<sub>L8</sub>. By compound is meant either a small molecule or a repeat unit of a polymer. The invention also provides a solid polymer electrolyte membrane, a membrane electrode assembly, a gas diffusion electrode, an electrocatalyst coating composition, and a fuel cell.



FR, GB, GR, HU, IE, IT, LU, MC, NL, PL, PT, RO, SE, SI,  
SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ,  
GW, ML, MR, NE, SN, TD, TG).

(88) Date of publication of the international search report:  
16 June 2005

**Published:**

- with international search report
- before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments

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